

# Business Scenario: Certification



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## Executive Summary

Customers, contractors, vendors, component suppliers, standards bodies, and certification bodies are all engaged in one way or another in certification. They are all a part of a value chain that results in solutions. Certification has the potential to provide many benefits to this value chain including:

- Assurance that the product has been scrutinized and verified to meet some specific functional and/or interoperability requirements
- Stimulated commercial uptake through trust of buyers and agencies
- Protection in the event of disputes about product liability

A certificate is a mark of trust, such as UL. It implies some successful assessment against stated and specific criteria, in many cases determined by conformance testing. Conformance testing is a commonly used and successful means for assessing and providing evidence of the correctness of the implementation of the criteria. The certificate is awarded by, or through, a certification process that is appropriately set up for the stated criteria and the state of the subject of certification. Certification results in certified components, people, or processes. Certification can be run internally, or by third parties called Certification Authorities. As a mark of trust, a certificate implies that if there is a failure in the component to meet the criteria, then there is an established recourse for action.

Certification has its pros and cons, but a good certification program optimizes the pros and minimizes the cons. Attributes of a good certification program include:

- Appropriate
- Cost-effective
- Criteria-based Measures
- Timely
- Holistic
- Trusted

A standards based certification program lowers the cost and the time from a customer-specific approach, and has higher integrity than the self-declaration approach.

Much work has to be done to educate the community of buyers and suppliers on these concepts and immediate next steps are proposed to begin on this journey. The following describes the above concepts in greater detail.

## Preface

Certification impacts processes in standards development, product development, solutions, marketing, and management. The key questions are what, where, how, and when do you need certification. It would be difficult to certify everything—this would take way too much time and would cost too much money—and it is not appropriate to certify everything. At the same time, “certification” means very different things to different people in different environments. With that in mind, what is a realistic strategy for certification and what role should consortia play?

The notes in this document resulted from a meeting of government and private sector IT executives. The scope is, therefore, restricted to IT products and services. This document captures some crucial thoughts that require attention when considering certification. Some of the assertions affirm, and some contradict, popular notions about certification. Such popular notions include:

- Though quality (product not meeting the requirements now or in the future) is a prime motivator for certification from a customer perspective as the end-user or in the supply chain, certification only plays a simple role in quality. Quality is the result of much more than just certified products.
- Time and costs spent everywhere are ultimately passed on to the consumer of the products. Certification costs end up affecting the price of the product and the time-to-market-availability.
- Use of certification in certain places and at certain times causes pain in terms of high costs, or a negative impact on innovation.
- Lack of certified components in other situations causes pain in terms of uncertain quality and interoperability.

The Open Group is sponsoring a broad look at the certification area. This report documents the first step in that journey by documenting the thoughts of those that attended a Business Scenario Workshop to discuss the merits and pitfalls of certification.

## Motivation

The Open Group’s members are acting on a vision of Boundaryless Information Flow achieved through global interoperability in a secure, reliable, and timely manner. Global interoperability implies the pervasive presence of standards, but consumers of information technology often face a difficult choice between standards-based solutions and non-standardized innovations designed to solve specific problems. The challenge is to marshal the necessary resources and critical mass from the users of IT, the vendors of IT, and the standards-related bodies to make standards and certification of conformance to standards a productive and optimum part of the value chain. Choosing the right places for standardization and certification for the right reasons is not easy to do. It is only with cooperative efforts among standards organizations, user organizations, and vendor organizations that certification will achieve its optimal benefit in supporting Boundaryless Information Flow.

This Business Scenario captures the thinking of a select group of IT executives from vendors, large customers (including government), and standards development organizations regarding certification and testing. The process will continue; but at this stage, they have identified the business value of certification of conformance to standards, as well as the pain points related to doing it or not doing it. This document delivers those findings.

## Document Roadmap

This document is divided into four main sections.

The first section – “Business Scenario Overview” – briefly describes Business Scenarios and the background of the particular meeting that was held to capture the views expressed in this document.

The second section – “Certification Means” – presents an overview of the constituencies involved in standards and certification. In this section we document what is commonly meant by certification. This provides the foundation for subsequent analysis. In this section we seek to answer:

- Who is involved in certification?
- What does certification mean?
- Why do certification?

The third section – “Certification Pros and Cons” – comprises the analytical portion of the business scenario, where issues and objectives common to customers, manufacturers, suppliers, consortia, and certification authorities are analyzed and correlated with the environments and processes. This section establishes the importance and relevance of certification by describing the issues that certification addresses, as well pointing out issues that certification is thought to bring forward. In this section we seek to answer:

- What issues are addressed by certification?

The fourth section – “Summary and Certification Considerations” – presents an initial decision framework for certification from a business perspective. Here we seek to answer:

- What considerations are crucial?
- What are the typical certification options?
- What next steps should be pursued to make certification better understood?

# Business Scenario

## *Certification in the Enterprise*

*Interoperability is very important to us, we integrate technology on-the-fly for a joint task force ... we get interoperable products that are cost-effective out-of-the-box so we get better products that we can integrate easily to provide capability to our war fighters.*

– Ms. Dawn Meyerriecks, CTO DISA

*A Business Scenario is very effective in searching out and examining a problem. It is a practical means to start finding a solution.*

– Ed Harrington, EPH Associates

Certification has the potential to provide many benefits that support interoperability including:

- Assurance that the product has been scrutinized and verified to meet some specific functional and/or interoperability requirements
- Stimulated commercial uptake through trust of buyers and agencies
- Protection in the event of disputes about product liability

## **Business Scenario Overview**

In this section we briefly describe Business Scenarios and the background of the particular meeting that was held to capture the views expressed in this document.

### **Purpose of Scenario**

A Business Scenario packages and describes a business environment scoped by a particular problem or area; in this case, around the subject of certification. The purpose of this business scenario is to express business requirements for certification; it explores the issues, challenges, and advantages of certification. The intent is to enable constituencies to understand the needs, and the value proposition for meeting those needs, and to engage vendors and standards bodies in addressing certification and standards. The ultimate goal is to provide guidance that will assist organizations in determining a certification strategy; the initial goal is to provide a level set on the topic to educate.

### **Terminology**

**Certificate** – A written statement attesting (1) some fact about an object to which the certificate applies, or (2) the status and qualifications of a person holding a certificate.

**Certification** – (1) To state in a certificate. (2) The process of assuring some fact, or the status and qualifications of a person.

**Certified Component** – An information technology hardware or software part, sub-assembly, assembly, or system that holds a certificate.

**Standard** – A definition or format that has been approved by a recognized standards organization or is accepted as a *de facto* standard by the industry.

**Vendor** – A company responsible for the end-product that is delivered to the customer.

**Component Supplier** – A company responsible for supplying components, parts, and/or raw materials to vendors.

### **Background of Scenario**

To gather information for a Business Scenario it is productive to hold a workshop of people that are involved in the given area. For certification we sought out representation of the buy-side, the supply-side, standards, and certification and testing communities. The following that represented these communities attended the first input gathering session for this Business Scenario:

- Jim Bell, Hewlett-Packard Company
- Steve Bratt, W3C
- Ilya Burdman, NASA Scientific & Engineering Workplace Procurement (SEWP)
- Lisa Carnahan, NIST
- Jay Dawar, Nextel Communications
- Karl Dubost, W3C
- Ed Harrington, EPH Associates
- E. Kenneth, Hong Fong, Defense Systems Office
- Jacqueline Knoll, The Boeing Company
- Julie Mintz, DISA
- Walter Stahlecker, Hewlett-Packard Company
- Tony Stanco, US E-Gov
- Claudio Stanziola, IEEE
- Jerry Walker, IEEE

The Open Group Business Scenario team comprised:

- Terry Blevins, Facilitator
- James de Raeve, Subject Expert

- Deborah May Schoonover, Primary Recorder
- Maryann Karinch, Secondary Recorder

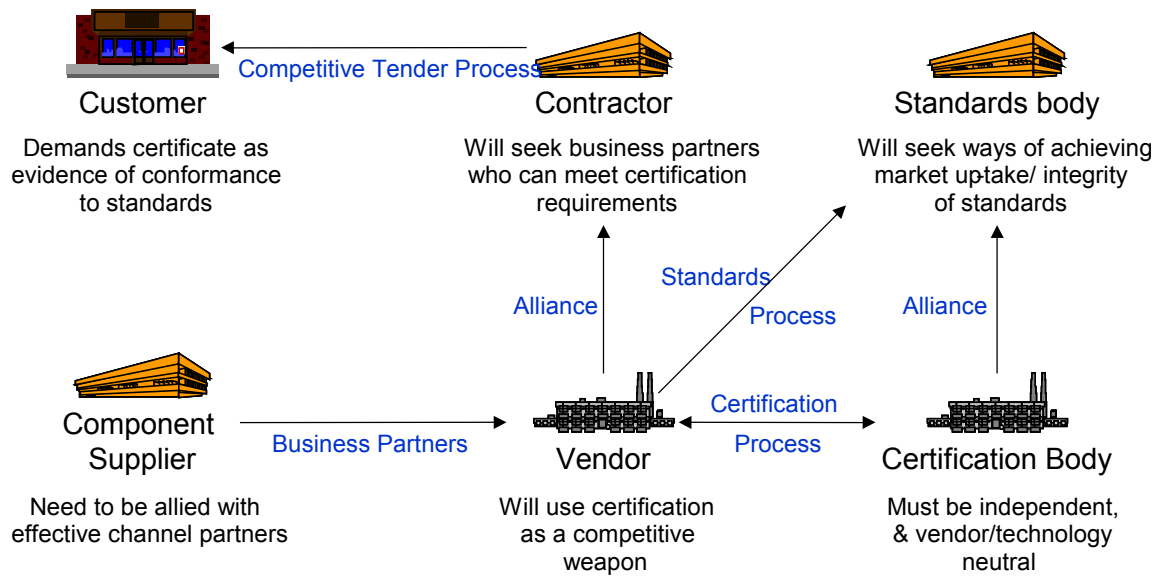
**Certification Means ...**

In this section we present an overview of the constituencies involved in standards and certification. We also document what is commonly meant by certification. This provides the foundation for subsequent analysis. In this section we seek to answer:

- Who is involved in certification?
- What does certification mean?
- Why do certification?

**Constituencies**

The following diagram provides one example of how the constituencies most interested in certification interact. Other scenarios can be added over time.



**Figure 1: Constituencies**

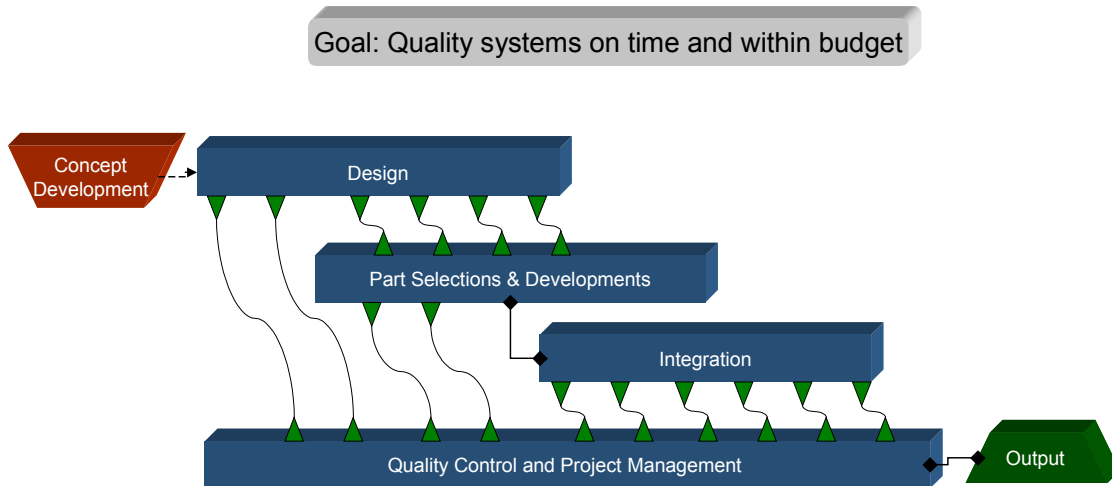


The table below describes the roles of these constituencies.

Constituency	Role Played
Customers	Procure and integrate components to create solutions that may be the subject of certification and that are commonly composed of some certified components. Customers engage in competitive tendering processes with contractors.
Contractors	Provide services to customers, typically used on large projects that deal with multiple vendors. Contractors engage in competitive tendering processes with customers. Contractors have alliances with vendors.
Vendors	Build products that may be the subject of certification. Vendors have alliances with contractors. Vendors have business partnerships with component suppliers. Vendors engage in the standards process with standards bodies. Vendors engage in the certification process with certification bodies.
Component Suppliers	Supply components typically as business partners to vendors; may be required to prove that their products meet certain criteria through certification. Component suppliers have business partnerships with vendors.
Standards Body	Develop technical specifications that establish some of the criteria for certification. Standards bodies are engaged in the standards process with vendors. Standards bodies have alliances with certification bodies.
Certification Body	Provide certification and/or testing services, especially those involved with conformance certification and/or testing. Certification bodies have alliances with standards bodies. Certification bodies engage in the certification process with vendors.

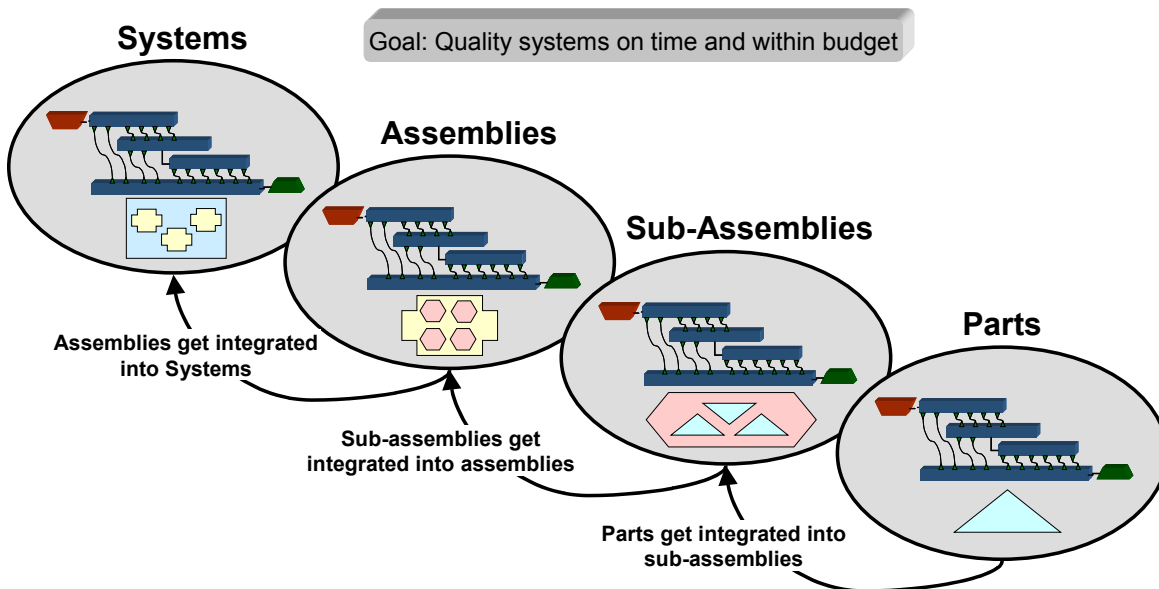
The constituencies above are engaged in what might be called a “solutions value chain”. Although this value chain is too complex to describe in detail here, it is important that we discuss the subset that is pertinent to our topic of certification: systems integration. The system integration portion of the solutions value chain must deal with the incorporation of technologies, that could be component technologies as sub-assemblies, or component technologies incorporated into assemblies. These assemblies could be hardware assemblies, software assemblies, or combinations of hardware and software. Technologies, hardware, and software, of course will have different levels of maturity, and it is these different levels of maturity that is especially relevant to certification, as we will describe below.

An example of this in practice would be those organizations involved in creating an airplane, or a satellite, or a complex computing system. Obviously there is great interest in ensuring that the components used in an airplane meet certain standards. Additional consideration must be given when an assembly may be required to interoperate with other assemblies, like or un-like. Each of these concepts can drive different needs for certification. The following figure depicts a notional process view likely to exist in any organization engaged in a construction role of the solutions value chain.



**Figure 2: Notional Process**

Critical in the above process is the integration phase where multiple components, sub-assemblies, and assemblies come together to produce high-quality output on-time and within budget. However, it is actually not as simple as this as there is typically an integration chain where many components, sub-assemblies, and assemblies are developed concurrently and integrated at different levels – this can be referred to as a “system integration value chain” that results in high-quality systems on-time and within budget, as depicted in Figure 3.



**Figure 3: A Systems Integration Value Chain**

The bottom line is that certification should be “assessed” in terms of its ability to add value to the systems integration value chain.

### **So what does Certification Mean?**

A certificate is a mark of trust, such as UL. It implies some successful assessment against stated and specific criteria in many cases determined by conformance testing. Conformance testing is a commonly used and successful means for assessing and providing evidence of the correctness of the implementation of the criteria. The certificate is awarded by, or through, a certification process that is appropriately set up for the stated criteria and the state of the subject of certification. Certification results in certified components, people, or processes. Certification can be run internally, or by third parties called Certification Authorities. As a mark of trust, a certificate implies that if there is a failure of the component to meet the certification criteria, then there is an established recourse for action.

Certification provides a means to deal with the issue of a component, sub-assembly, assembly, or system being what it purports to be. Stated another way: certification provides an independent assessment of a product or system’s ability to repeatedly meet a set of requirements.

At one level, certification can help a buyer buy more smartly because of the existence of certified components. At another level, certification can help a vendor feel more confident in their product. This view depends on where you sit in the systems integration value chain. To some, the value of certification of the system is obviously more important than the certification of the parts ... the sum of the parts are not the same as the whole. In most cases certification is important for the next-level consumer in the value chain.

### So why Certification?

Above we point out that certification is about trust. A component that has a certificate is trusted to meet a set of criteria. Of course this assumes that the criteria themselves are appropriate and we will discuss that in the section below on what it takes to have a good certification program. Given the assumption that one has good criteria, then the benefits are:

- Increased probability that the whole (or system or solution) will operate as expected
- Improved interoperability of components by assuring common interpretation of specifications
- Facilitated improvements in specifications as the process uncovers ambiguities in standards
- Facilitated improvements in implementations as the process uncovers ambiguities in products
- Accelerated convergence between the specifications and implementations as the process uncovers ambiguities in the specification and errors in interpretation built into products
- Improved supplier confidence in parts they provide can itself be a differentiator

### Certification Pros and Cons

This section comprises the analytical portion of the Business Scenario, where issues and objectives common to customers, manufacturers, suppliers, consortia, and certification authorities are analyzed and correlated with the environments and processes. This section establishes the importance and relevance of certification by describing the issues that certification addresses, and points out issues that certification is thought to bring forward. In this section we seek to answer:

- What issues are addressed by certification?

First let us examine some of the pain points surrounding certification.

#### Pain Points

The pain caused by the lack of certification, or the lack of **availability of certified components, people, and/or processes** falls into the following categories. Understanding these will help us understand more about why certification is important.

- **High risk and cost of decision-making** on component acquisition (single user view of “requirements” can be less effective than shared requirements manifested in standards)
- **High cost of procurement and acquisition** (single user view of “requirements” can be less effective than shared requirements manifested in standards)
- Lack of **recourse** if a product doesn’t act as purported
- **Unsubstantiated claims**, often caused by misuse of a brand
- **Customer dissatisfaction** because products just don’t work as a standard indicates or products don’t interoperate

- **Unfulfilled vision** as the lack of adherence to some standards will have a negative impact on achieving a long-term vision such as the semantic web
- **High cost of integration** because components that are integrated do not fit together easily
- **Longer time** to develop solutions because of the need to develop interfaces that enable integration of components

There are most certainly other issues that result from the lack of certification; however, the above give us a very good idea of what is addressed by good certification programs. Despite the list above, we do need to appreciate that certification is about risk management, about understanding trade-offs, and using that to minimize risk. The major risk areas are quality (product not meeting the requirements now or in the future), time, and costs.

Evident in this trade-off one can examine pain caused by certification that must be acknowledged. Understanding this pain will help us better understand how to be more effective and efficient at certification.

- **High cost of development** as a developing organization may incur incremental cost of certification without justification (such as requiring certification when testing or simple claim of conformance would do)
- **High costs of integration** as each developing organization may add a re-certification of component parts in certifying a sub-assembly, assembly, or system if the program isn't designed correctly
- **Cost of policing** as a certification program requires additional attention on making sure that the program's integrity is intact
- Issues of **liability** in complex value chains; who is accountable if a product doesn't act as purported
- **Innovator dissatisfaction** because investments in standards efforts are very costly and then easily taken up by others resulting in a disproportionate expense being applied to the innovators
- **Certification overload** when a product is being requested to adhere to multiple, and sometimes competing, standards, such as different standards for different locations in the world
- **Lack of attention to the whole** when certification programs focus on piece-part certification rather than aggregations where certification is more significant
- **Longer time** to bring solutions to market if certification becomes an ineffective choke point, such as having only one central test laboratory

As you would expect cost is seen as an issue, but this must be examined from a holistic view. Is the cost of certification in excess of the costs associated with poor-quality products? Also, it is duly noted that quality, time, and costs are always manifested to the end-user in some fashion.

It is the task of those that build certification programs to make programs that make sense.

The constituencies represented discussed pain points related to certification. The table presents these pain points along with some explanation. One-word or phrase descriptions given were as follows: risk, cost, time, inclusivity, conflicting standards, stifling innovation, awareness, perceived need, invalid decisions, and finally, the idea that certification stifles innovation.

Pain Points	Comments
Cost	Both vendors/OEMs and consumers have to bear the cost of certifying; for large consumers such as DoD, the cost of procuring new products with certification can be very high. Ideally, costs should scale down over time. <b>Note: This was the most repeated pain point.</b>
Lack of system-wide certification ( <i>aka</i> don't see the forest for the trees)	"We can't congratulate ourselves on certifying each piece if the pieces don't work together." Defense Systems Office Profiles of a system can sometimes be more useful than certification of each and every part. <b>Note: This was the second most repeated pain point.</b>
Disparate vendor response to consumers' desire for consistent and reliable solutions (also see "multiple standards")	Example: Consumers have issues of money, privacy, and personal information in exchanging information on the Web. It's important that the risks are mitigated and the way to do that is for vendors to follow standards and embrace certification.
Loss of innovation/reduction of competition	Requirement to provide certified product can inhibit R&D of companies of all sizes, particularly smaller ones.
Irregular adherence to standards resulting in waste of resources	In cases where interpretations of standards differ, the assurance of compliance is no assurance of interoperability; a certification program is supposed to address this, but may not. "You want standards to be at the point where you take them for granted." Hewlett-Packard Company
Diminished value of the brand	Over time, a phrase such as "meets UL" can be just as effective in the marketplace as "certified by UL".
Choke point	If there is a single certification source, there is a choke point; the alternative is multiple test organizations.
Perception of certification as just a marketing tool	It is an instrument of quality used as a marketing tool, but the former must be stressed, not the latter.
Lack of leadership among the "top 5%"	"If 95% of the industry are followers, they could come along if the top 5% made the 'right' decision." Hewlett-Packard Company
Longer time to manufacture/release	The certification has to add value and relatively quickly. If it adds many months to the release of a product, that's not good.
Legal issues related to dilution of the mark	Example: Some declarations of compliance with the IEEE 802.11(b) standard are meaningless. IEEE doesn't have the resources to chase violators, nor does it have the resources to create testing programs around all IEEE standards.

Pain Points	Comments
Multiple (conflicting) standards for the same technology	Each of several different standards in conflict might be associated with a testing and certification program. Hewlett-Packard calls for “one specification worldwide, one test for conformance, and suppliers’ declaration of conformance” to cut down on redundancy.

Again, certification decision-making must be based on the timing, cost, and value of independent certification for products in meeting advertised claims for standards compliance.

In the world of ordinary items such as plugs and tools, certification is taken for granted. We cannot do that with IT—yet. What is a realistic strategy for IT certification?

Constituencies represented supplied definitions that contained both common themes and conflicts. For example, a common theme was that certification was somehow linked to quality, at least of components, but that certification of components of a system or solution in no way reflected the quality of that system or solution as a whole.

The following table provides a profile of remarks:

Characteristics of Certification	Corollary/Subset(s)
Guarantee of status	Assurance of conformance to a standard Assurance of some degree of interoperability Usability
Standard-based	Certification has a lifecycle tied to standard’s lifecycle
Result of testing	External (objective) test Internal (self-certifying) test leading to warranty, not certification Internal test followed by external (objective) audit
Front-loaded costs	Cost-effectiveness in the long term
Exclusivity	Marketplace differentiation

**Driving Issues/Questions**

In order to address the pain points presented above, the following issues, or questions, require attention:

- Independent testing – when is it needed or not needed?
- What are the market drivers for certification?
- How do we measure the quality of a test suite?
- How do we understand the testability and quality of standards? Including elements open to interpretation?
- How do we assess the value to the end-user? Where does certification make a difference and where is it irrelevant?

- How do we deal with certification of aggregated components (i.e., system or solution)?
- What is the chain of trust in the supplier/buyer relationship, vendor/certifying body relationship, and other interactions of constituent groups? And how do we maintain this chain of trust?
- How do we assess the efficacy of certifying bodies?
- How do we provide guidance on the clarity of purpose of a certification program (i.e., certifying a \$10 item *versus* a costly one) and manage a commensurate complexity of process?
- Can or should certification be free in any circumstances?
- How do we deal with the lifecycle of certification in synchronization with the lifecycle and maturity of technologies?
- How do we deal with the desire for common building blocks in a system coupled with the desire for a differentiated system?
- How do we deal with certification in the international environment?
- What is the role and responsibility of product developers, and consumers?

These questions again need to be addressed by a sound certification program.

## Summary and Certification Considerations

This final section presents an initial decision framework for certification from a business perspective. Here we seek to answer:

- What considerations are crucial?
- What are the typical certification options?
- What next steps should be pursued to make certification better understood?

### A Good Certification Program

This Business Scenario has the potential to improve business productivity by answering questions related to asset utilization, market satisfaction, risk reduction, and other key concerns as they pertain to IT certification. Ultimately, in addressing the certification issue, results may even include measurements of that improvement in areas such as time-to-market uptake, increases in market share, shortening of project cycles, advances in customer satisfaction, and reduction in run rates. At this point in time a certification program should have the following characteristics to address many of the issues stated here:

#### Appropriate

- Mapped to the lifecycle of a technology – early technology has more risk, so there's more need for certification. However, too early and there are no standard criteria to use. As a technology becomes more mature, the value of certification becomes somewhat lower.



- Tests should be tailored to the needs of the market for the product, as should the overall certification program.
- Need to know the purpose: need to determine what will be certified and set appropriate certification goals. Testing may be sufficient in some cases.
- A certification program should be optimized for the complexity of the solution – not its parts. A program should avoid spending too much money certifying low-level components where it is very easy to determine whether they work or not. The certification program should be mapped to the appropriate value-add chain.
- A certification program should address synchronization and assessment of the parts.
- A certification program should be inclusive in the sense that it considers the issues and practicalities of small to medium enterprises.

#### **Cost-Effective**

- A certification program should be tailored to match the needs to benefits as it evolves throughout a lifecycle of the technologies and products of the solution.
- Over time, the cost and effort of certifying a maturing product or technology should decline.

#### **Criteria-Based Measures**

- A certification program should be based upon good measurable standard criteria, or set of standard criteria, that are objective and testable.
- A certification program for a solution should be based upon an aggregation of standards criteria.

#### **Timely**

- A certification process should be sensitive to the lifecycle changes of technology and should take (much) less time to certify than the lifecycle of a product.

#### **Holistic**

- A certification program should have a publicly named certification authority.
- A certification program should have a public policy statement of liability, warranty, and guarantee.
- A certification program should include certification policy development, certification program development, certification testing, certification operations, certification problem resolution, and recourse procedures.
- A certification program should include automation wherever possible to control costs and scale.

- A program should provide a level of certification appropriate to the need for the program since one size does not fit all cases. For example, different levels could be test, letter of conformance, certificate, etc. using different techniques such as plugfests, bake-offs, certification test audits, etc.
- A certification program should have a stated position on testing, should have a means to do testing, and needs to be driven by objective tests.
- A certification program should focus on standards that are testable.

#### **Trusted**

- Trust of the Certification Authority is important, especially to the next-level consumer; therefore, the Certification Authority must be open for external audit and validation.
- The Certification Authority should have procedures for its own processes to ensure that they meet the requirements of the certification programs, including its testing process.
- A body that represents the interest of the given program should appoint the Certification Authority.
- The Certification Authority should be a known and trusted organization within the industry.

#### **Certification Program Options**

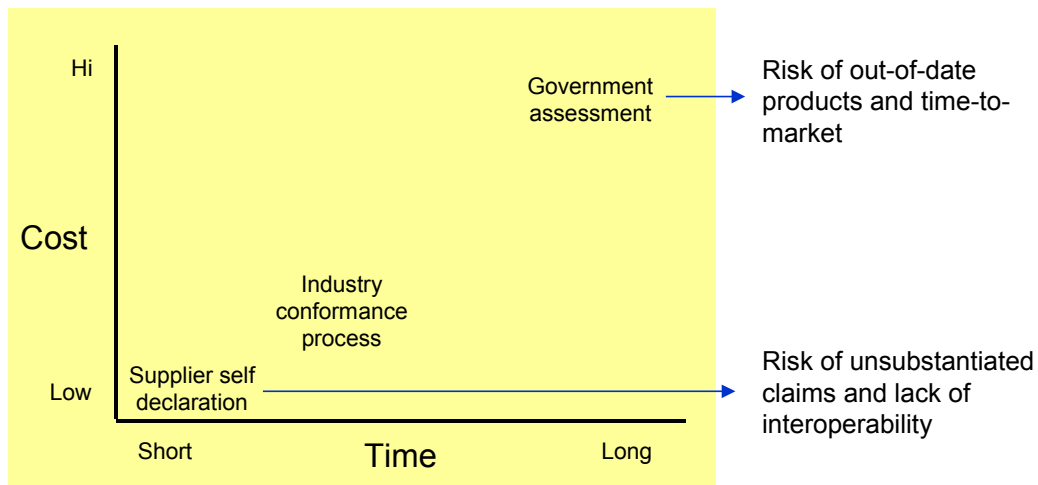
There are different types of certifications, used in different situations for different purposes. The following figure depicts the different areas of focus for certification. On one dimension, certification can apply to people, products, or processes. The certification process would be different for each of them. On another dimension, certification can be based upon a specific vendor's requirements, based upon a specific customer's requirements (such as government assessment), or based upon standards. Again the certification process would be different for each of them.

Our particular attention in this Business Scenario is in the space of product certifications, be they customer-specific requirements-based or be they standards-based. A customer-specific certification program would not allow a supplier to spread the cost over a large customer base. Nor would they be able to cost-justify automation for a single procurement. Each of these would push up costs and lengthen time. A standards-based certification program, however, does lower the cost per unit because multiple products, and multiple vendors are supporting the standards. There is a better business case for automation that improves the timeliness of the certifications. The added benefits are encouragement of COTS product availability as the barrier to certify is lowered.

	Vendor specific	Customer specific	Standards based
People			
Products		These two areas are the focus of this business scenario and are often confused in discussion on certification	
Processes			

**Figure 4: Certification Areas**

The different types of certification carry different costs and different risks. The following figure depicts this concept. The lowest cost and fastest time-to-market can be achieved by self-declaration of compliance. However, with self-declaration the customer carries the risk of not actually getting a fully-conformant product and having no recourse. Some participants referred to this as warranty rather than certification. Lack of interoperability is likely. On the other extreme, government assessment (an example of customer-specific certification) is very expensive and time-consuming for all parties and it is possible that the time it takes to achieve certification may be longer than product lifecycles, which can result in obsolete implementations or implementations that do not have the latest updates. A standards-based certification program lowers the cost and the time from the customer-specific approach, and has much higher integrity than the self-declaration approach.



**Figure 5: Costs and Risks**

### Next Steps

The following are some immediate next steps:

- Put together a session in San Diego; e.g., a 2-3 hour session with a panel discussion. Invite decision-makers and consultants, and discuss findings on how, when, and where to do certification.
- Vet this document with attendees and request comments and improvement points.
- Request specific case studies to add to appendixes.
- Draft a set of alternatives; e.g., call for action, publication, etc.
- Plan a paper on the Economics of Certification.

### Appendix A: Business Scenarios – Additional Information

A detailed description of Business Scenarios is available at:

[http://www.opengroup.org/togaf/p4/bus\\_scen/bus\\_scen.htm](http://www.opengroup.org/togaf/p4/bus_scen/bus_scen.htm)

which is part of The Open Group Architectural Framework (TOGAF) website:

<http://www.opengroup.org/public/arch/>

This publicly available document describes an open framework and method for IT architecture, which includes Business Scenarios as a method for articulating the business and technical requirements that architecture work is to address.